FEMI.209:345322

FLOOD INSURANCE STUDY

ORIGINAL

COMPLETED

BOROUGH OF STOCKTON, NEW JERSEY
HUNTERDON COUNTY

APRIL 15, 1982

Federal Emergency Management Agency

COMMUNITY NUMBER - 345322

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

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1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Borough of Stockton, Hunterdon County, New Jersey, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This information will allow Stockton to continue participation in the regular program of flood insurance by the Federal Emergency Management Agency (FEMA) with the most current data. Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these federally-supported studies are based. These criteria take precedence over the minimum federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.3. In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses in this study represent a revision of the original analyses by the U. S. Department of Argiculture, Soil Conservation Service for the Federal Emergency Management Agency, under Inter-Agency Agreement No. IAA-H-16-72. The updated version was prepared by the New Jersey Department of Environmental Protection, Division of Water Resources under agreement with the Federal Emergency Management Agency, Contract No. H-3959. This study, which was completed in December 1980, covered all significant flooding sources in the Borough of Stockton.

1.3 Coordination

The New Jersey Department of Environmental Protection, the Philadelphia District of the U. S. Army Corps of Engineers, The Delaware River Basin Commission, the Trenton and Harrisburg offices of the U. S. Geological

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Survey, the National Weather Service, the Soil Conservation Service, representatives of the borough and local citizens were all contacted for coordination of mapping and hydrologic and hydraulic information during the course of this study.

The results of this study were reviewed at the final Consultation and Coordination Officer's (CCO) meeting held on December 3, 1981, which was attended by representatives of the FEMA, the New Jersey Department of Environmental Protection, Division of Water Resources (the study contractor), and interested citizens of the Borough of Stockton.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Borough of Stockton, Hunterdon County, New Jersey. The area of study is shown on the Vicinity Map (Figure 1).

The Delaware River for its entire length along the borough's southern boundary, Brookville Creek from its confluence with the Delaware and Raritan Canal upstream for a distance of 2,500 feet, to the corporate limits and Wickecheoke Creek from its confluence with the Delaware and Raritan Canal upstream for a distance of 2,000 feet to the corporate limits were studied by detailed methods. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction for the next five years, through December 1985.

2.2 Community Description

The Borough of Stockton is located on the western border of central New Jersey in southwestern Hunterdon County, approximately 20 miles northwest of Trenton, New Jersey. It is bordered on the south by the Township of Solebury across the Delaware River in Pennsylvania, and on the west, north and east by the Township of Delaware.

The Borough of Stockton was originally part of the Township of Amwell, when the area was part of Burlington County. In 1713, Amwell became part of Hunterdon County, and in 1838 the township was subdivided into the Townships of Delaware, Raritan and Amwell. The Borough of Stockton was subdivided from the Township of Delaware on April 14, 1898. The 1977 population of 620 represents a 30.7 percent increase over the 1960 population (Reference 1). The township has a total land area of 0.6 square mile.

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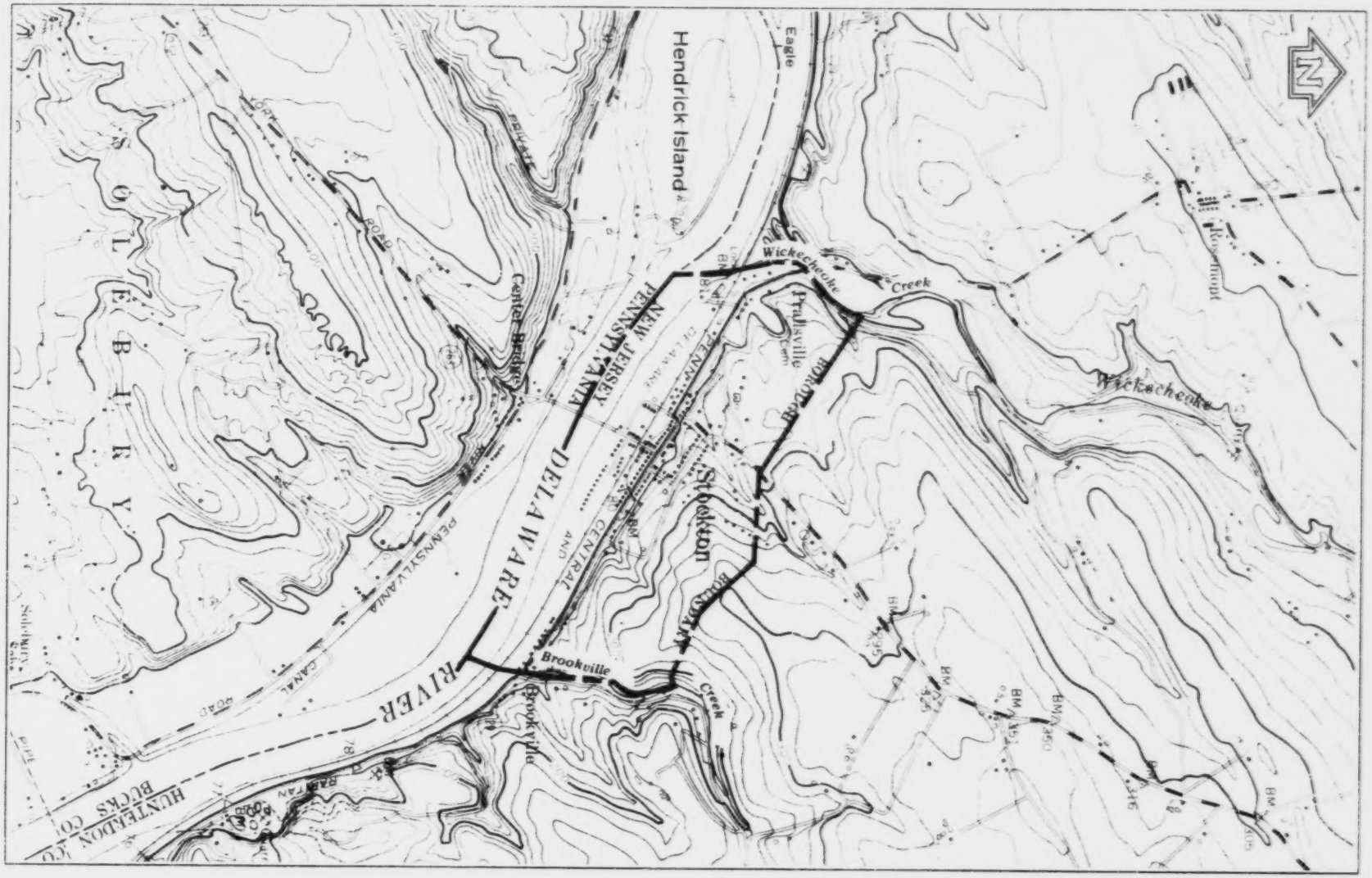

FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

APPROXIMATE SCALE

2000 0 2000 4000 6000 FEET

VICINITY MAP

The climate in this area is continental, and is influenced only moderately by the ocean. Maximum daily temperatures average 64 degrees Fahrenheit (°F) and minimum daily temperatures average 42°F, with extremes ranging from 99°F to -7°F. Average annual precipitation is well distributed over the year and totals approximately 45 inches.

The Borough of Stockton lies in the Piedmont Plateau region, which is part of the Appalachian Province. The Piedmont is characterized by nearly level lowlands, with occasional ridges and low hills, and is underlain by shale (Reference 2). The relatively flat topography of a river terrace dominates the southern portion of the borough along the Delaware River.

The Delaware River, with a total drainage area of 12,765 square miles, is the major waterway feeding the Delaware Bay. The river flows south from its headwaters in the Catskill Mountains in southeastern New York, and flows along the southern border of the Borough of Stockton. The watershed upstream of the study area consists of primarily open space, agricultural and wooded land away from the main river channels, and areas of highly urbanized development along the river banks.

Brookville Creek begins in the southwestern part of the Township of Delaware and flows generally southwest to its confluence with the Delaware and Raritan Canal. The last 2,500 feet of the streams distance forms the southeastern corporate limits between the Borough of Stockton and the Township of Delaware.

Wickecheoke Creek has its headwaters in the Township of Raritan and flows generally southwest. Approximately the last 2,000 feet of the creek forms the northwestern corporate limits between the Borough of Stockton and the Township of Delaware.

The watersheds of Brookville Creek and Wickecheoke Creek consist mostly of open space, agricultural land and woodlands, with very little residential development. The only significant development occurs near the confluences of Brookville Creek and Wickecheoke Creek. Development in the borough is almost entirely residential and agricultural. Business within the borough consists primarily of small shops and stores which cater to the local community.

2.3 Principal Flood Problems

Flooding has been a continual problem along the Delaware River since settlement of the area in the early part of the 17th century. The Delaware River Basin is located in an area of major storm paths.

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Although the worst floods in the past generally resulted from excessive rainfall alone, flooding on the Delaware River in early spring can be even more severe because of snowmelt and moving ice.

Floods of major significance on the Delaware River occurred in October 1903, August 1955 and May 1972. The flood of August 1955 was the most severe event ever recorded on the Delaware River. This flood, which had approximately a 150-year recurrence interval, was the result of excessive rainfall from three separate storms which hit the area in early August. According to the U. S. Geological Survey (USGS) gage in Flemington, New Jersey, the nearest official recording station, a total of 15.2 inches of rain fell on the area during the period from August 1 to August 18, culminating with Hurricane Diane. Major damage was done to communities, roads and bridges along the Delaware River.

The most recent high water on the Delaware River occurred in June 1973. The flood of June 1972, resulting from the rainfall of Tropical Storm Agnes, although producing severe flooding on the Schuylkill River and many other streams in Pennsylvania, did not cause major flooding on the Delaware River (References 3 and 4).

Within the Borough of Stockton, the major source of flood damage is the Delaware River which inundates numerous commercial stuctures and residences in the Bridge and Mill Street areas. Major flooding near the mouths of Wickecheoke Creek and Brookville Creek is primarily the result of backwater from the Delaware River.

2.4 Flood Protection Measures

No flood protection measures to reduce potential flood damage exist in the borough itself. However, water-supply, power and flood control reservoirs outside of Stockton have reduced the probability of damaging floods within the borough. Table 1 lists the major regulatory reservoirs and lakes for the Delaware River Basin upstream of the Borough of Stockton (References 3 and 5). Completion dates for two proposed reservoirs in the Lehigh River basin, Aquashicola and Trexler, have not been set, therefore, the effects of these reservoirs were not considered in this study.

TABLE 1 - REGULATORY LAKES AND RESERVOIRS UPSTREAM OF THE BOROUGH OF STOCKTON, NEW JERSEY

Name	Stream	Drainage Area	Storage Began
Lake Wallenpaupack	Wallenpaupack Creek	228	November 1925
Prompton Reservoir	West Branch Lackawaxen River	59.6	July 1960

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TABLE 1 - REGULATORY LAKES AND RESERVOIRS UPSTREAM OF THE BOROUGH OF STOCKTON, NEW JERSEY - continued

Name	Stream	Drainage Area	Storage Began
General Edgar Jadwin Reservoir	Dyberry Creek	65.6	October 1959
Francis E. Walter Reservoir	Lehigh River	289	February 1961
Beltzville Lake	Pohopoco Creek	96.3	February 1971
Pepacton Reservoir	East Branch Delaware River	371	September 1954
Swing Bridge Reservoir	Mongaup River	118	January 1930
Neversink Reservoir	Neversink River	91.8	January 1953
Cannonsville Reservoir	West Branch Delaware River	454	September 1963
Penn Forest Reservoir	Wild Creek	16.5	October 1953
Wild Creek Reservoir	Wild Creek	22.2	January 1941
Lake Hopatcong	Musconetcong River	25.6	1828
Toronto Reservoir	Black Lake Creek	23.2	January 1926
Cliff Lake	Black Lake Creek	6.5	January 1939

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long-term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one-percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten) and, for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here

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reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

Flood-frequency analysis procedures as developed by the Water Resources Council were employed for the Delaware River. A log-Pearson Type III distribution of annual peak discharges at the stream gage at Trenton, New Jersey, was used to determine values of the 10-, 50-, 100- and 500-year peak discharges (Reference 6). Seventy years of records at the Trenton gage were used in this analysis. Modification of frequency distributions was made to allow for effects of reservoir regulation.

Flood-frequency values for Brookville Creek and Wickecheoke Creek were determined by use of a regional regression analysis which considers drainage area, channel slope, surface storage and the extent of impervious areas in determination of the peak discharges for the 10-, 50-, 100- and 500-year floods (Reference 7).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 2, "Summary of Discharges".

TABLE 2 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
DELAWARE RIVER					
At the downstream corporate limits	6,780	170,000	250,000	288,000	387,000
BROOKVILLE CREEK					
At confluence with Delaware and Raritan Canal	1.26	320	540	690	1,110
WICKECHEOKE CREEK					
At confluence with Delaware and Raritan Canal	26.39	3,460	5,500	6,770	10,450

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3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the flooding sources studied in detail were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of these flooding sources.

Cross sections for the backwater analysis for the Delaware River were field-surveyed by the U. S. Army Corps of Engineers (COE) with additional information taken from detailed topographic maps (Reference 8). All cross sections for Brookville Creek and Wickecheoke Creek were obtained by photogrammetric methods and were located at close intervals above and below bridges and culverts in order to compute significant backwater effects. All bridges and culverts were field surveyed to obtain structural geometry.

Roughness coefficients (Manning's "n") used in the hydraulic computations were assigned based on field inspection of the flood plain areas, by comparison with high-water marks where available, and for the Delaware River, from previous studies by the COE. For the main channel of the Delaware River, the roughness coefficient was 0.029 and the overbank value was 0.10. For Brookville Creek the main channel roughness value ranged from 0.025 to 0.035, and the overbank value ranged from 0.11 to 0.12. The roughness value for the main channel of Wickecheoke Creek ranged from 0.035 to 0.045 and the overbank value ranged from 0.09 to 0.13.

Water-surface elevations for the floods of the selected recurrence intervals were computed through use of the COE HEC-2 step-backwater computer program (Reference 9). Starting water-surface elevations for the Delaware River were obtained from the USGS gage at Trenton. Brookville Creek and Wickecheoke Creek starting water-surface elevations were estimated at their mouths by the slope/area method outlined in the COE HEC-2 users manual (Reference 10).

Flood profiles were drawn showing computed water-surface elevations to an accuracy of 0.5 foot for floods of the selected recurrence intervals. Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway is computed (Section 4.2), selected cross-section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

There is a reach on Brookville Creek where supercritical flow occurs. This is a rapid flow (high velocity), which is sometimes highly turbulent, and usually occurs in steep parts of a stream. Subcritical flow, the more common type, has a relatively low velocity as it usually

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occurs on streams with flatter slopes. The supercritical reach on Brookville Creek extends from a point approximately 1,350 feet upstream of its mouth upstream to the corporate limits.

The flow transition between a supercritical and a subcritical region usually involves turbulence with an accompanying loss of energy. Furthermore, the length of this turbulent transition, called a hydraulic jump, is unpredictable and is different for each flow. It should be noted that hydraulic jumps for small streams usually occur within the channel banks and have little or no effect on the land adjacent to the stream.

According to an accepted engineering analysis known as open channel hydraulics, which involves the velocity and depth of the upstream supercritical sections, the hydraulic jumps that occur during the flooding of Brookville Creek are the undular type which involve relatively small turbulent energy losses and represent somewhat gradual transitions between the supercritical and subcritical regimes (Reference 11). Therefore, a linear assumption between the two flow regimes, as shown on the flood profiles, is a reasonable one.

All elevations used in this study are referenced to the National Geodetic Vertical Datum of 1929 (NGVD), formerly referred to as Sea Level Datum of 1929. Locations of the elevation reference marks used in the study are shown on the maps.

The hydraulic analyses for this study are based on the effects of unobstructed flow. The flood elevations shown on the profiles are valid only if hydraulic structures remain unobstructed, and dams and other flood control structures operate properly and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FEMA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100- and 500-year floods have been delineated using the flood elevations determined at each cross

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section; between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:2,400 with a contour interval of 5 feet (Reference 8). In cases where the 100- and 500-year flood boundaries are close together, only the 100-year boundary has been shown.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, may not be subject to flooding. Owing to limitations of the map scale and lack of detailed topographic data, such areas are not shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood can be carried without substantial increases in flood heights. Minimum standards of the FEMA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the State of New Jersey has established criteria limiting the increase in flood heights to 0.2 foot. Thus, floodways having no more than a 0.2-foot surcharge have been delineated for this study. Since the Delaware River forms the boundary between Pennsylvania and New Jersey, however, the New Jersey requirement of a 0.2 foot surcharge is not applicable for this river, and the standard 1.0 foot surcharge is applied. The floodways in this report are presented to local agencies as minimum standards that can be adopted or that can be used as a basis for additional studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plains. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 3).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway widths were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the floodway and the 100-year flood are either close together or collinear, only

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH[3] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Delaware River								
A	3,730[1]	870/425	27,990	10.3	81.4	81.4	82.4	1.0
B	5,920[1]	870/420	23,875	12.1	83.4	83.4	84.1	0.7
Brookville Creek								
A	403[2]	38/14	98	7.1	78.5	78.5	78.6	0.1
B	898[2]	31/18	84	8.3	94.0	94.0	94.2	0.2
C	1,358[2]	92/24	96	7.2	110.6	110.6	110.6	0.0
D	1,798[2]	15/8	37	18.7	118.1	118.1	118.1	0.0
E	2,364[2]	135/85	94	7.3	139.2	139.2	139.2	0.0
Wickecheoke Creek								
A	471[2]	97/69	628	10.8	83.9	77.9[4]	78.0	0.1
B	881[2]	132/82	1,003	6.8	83.9	80.5[4]	80.6	0.1
C	1,188[2]	150/42	872	7.8	83.9	81.5[4]	81.6	0.1
D	1,603[2]	82/26	570	11.9	83.9	83.7[4]	83.9	0.2

[1]Feet above corporate limits

[2]Feet above confluence with Delaware and Raritan Canal

[3]Width/width within corporate limits

[4]Elevation computed without consideration of backwater effects from the Delaware River

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

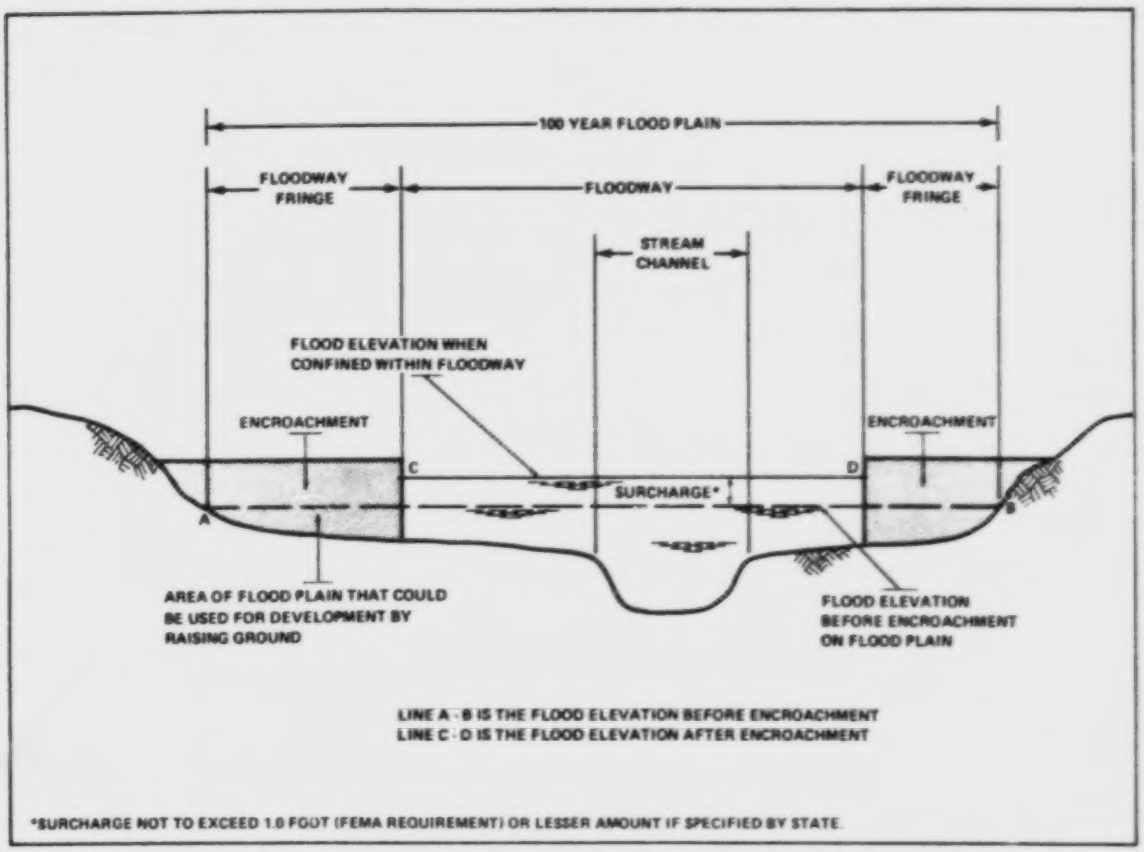
BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

FLOODWAY DATA

DELAWARE RIVER, BROOKVILLE CREEK AND WICKECHEOKE CREEK

the floodway boundary has been shown. Portions of the floodway widths for the Delaware River, Brookville Creek and Wickecheoke Creek extend beyond the corporate limits of Stockton.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 0.2 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC

Figure 2

Floodwaters from Brookville Creek were found to have hazardous velocities. Encroachment into areas subject to inundation by floodwaters having hazardous velocities aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities.

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To provide guidance for encroachment into these areas, a proposed floodway is delineated for that part of the 100-year flood plain that conveys flow.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "With Floodway" elevations presented in Table 3 for certain downstream cross sections of Wickecheoke Creek are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FEMA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHFs), and flood insurance zone designations for each flooding source affecting the Borough of Stockton.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the Borough of Stockton are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 4).

5.2 Flood Hazard Factors

The FHF is the FEMA device used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Delaware River Reach 1	01	-7.9	-2.3	+5.9	080	A16	Varies
Brookville Creek Reach 1	01	-1.3	-0.4	+1.1	015	A3	Varies
Wickecheoke Creek Reach 1	01	-2.2	-0.7	+1.7	020	A4	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

FLOOD INSURANCE ZONE DATA

DELAWARE RIVER, BROOKVILLE CREEK AND WICKECHEOKE CREEK

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The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the entire incorporated area of the Borough of Stockton was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zones A3,A4,A16: Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations shown, and zones subdivided according to FHF.

Zone B: Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; also, areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding.

Table 4, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the Borough of Stockton.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the Borough of Stockton is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FEMA.

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6.0 OTHER STUDIES

A Flood Plain Information report on the Delaware River was prepared by the COE in 1967 (Reference 12). That report was a planning document to evaluate the effects of the Tocks Island Dam Project. It did not assign frequencies to the discharges used, and therefore numerical comparisons with this report were not made.

A flood plain delineation report was published by the Delaware River Basin Commission in 1973 (Reference 13). That report was also a planning document with which numerical comparisons could not be made.

A Flood Insurance Study has been published for the Township of Solebury, located across the Delaware River in Pennsylvania (Reference 14). Discussions with the Baltimore District of the COE indicated that the Delaware River discharges used in the original Solebury study were based on an older, unpublished regional study done by the COE which did not consider hurricane effects of recent floods. The discharges used in the present study were based on more recent information and were coordinated between the USGS and the COE.

A Flood Insurance Study is currently being prepared for the Township of Delaware (Reference 15). The results of this study will match exactly with the results of the Stockton study.

This study is authoritative for purposes of the Flood Insurance Program, and the data presented here either supersede or are compatible with previous determinations.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic, and other pertinent data used in this study can be obtained by contacting the office of the Insurance and Mitigation Division of the Federal Emergency Management Agency, Regional Director, Region II Office, 26 Federal Plaza, Room 19-100, New York, New York 10278.

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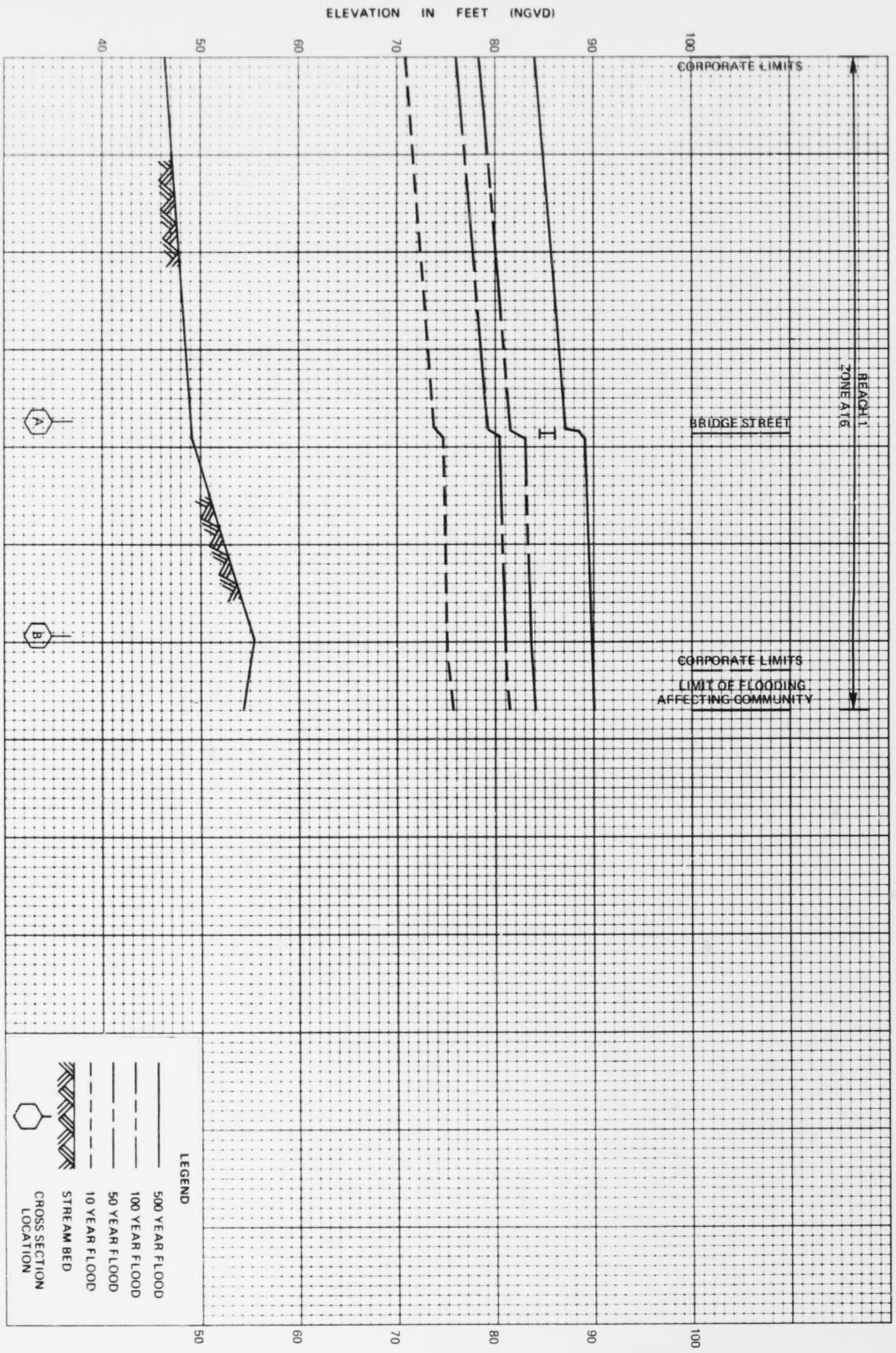

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

FLOOD PROFILES

DELAWARE RIVER

01P

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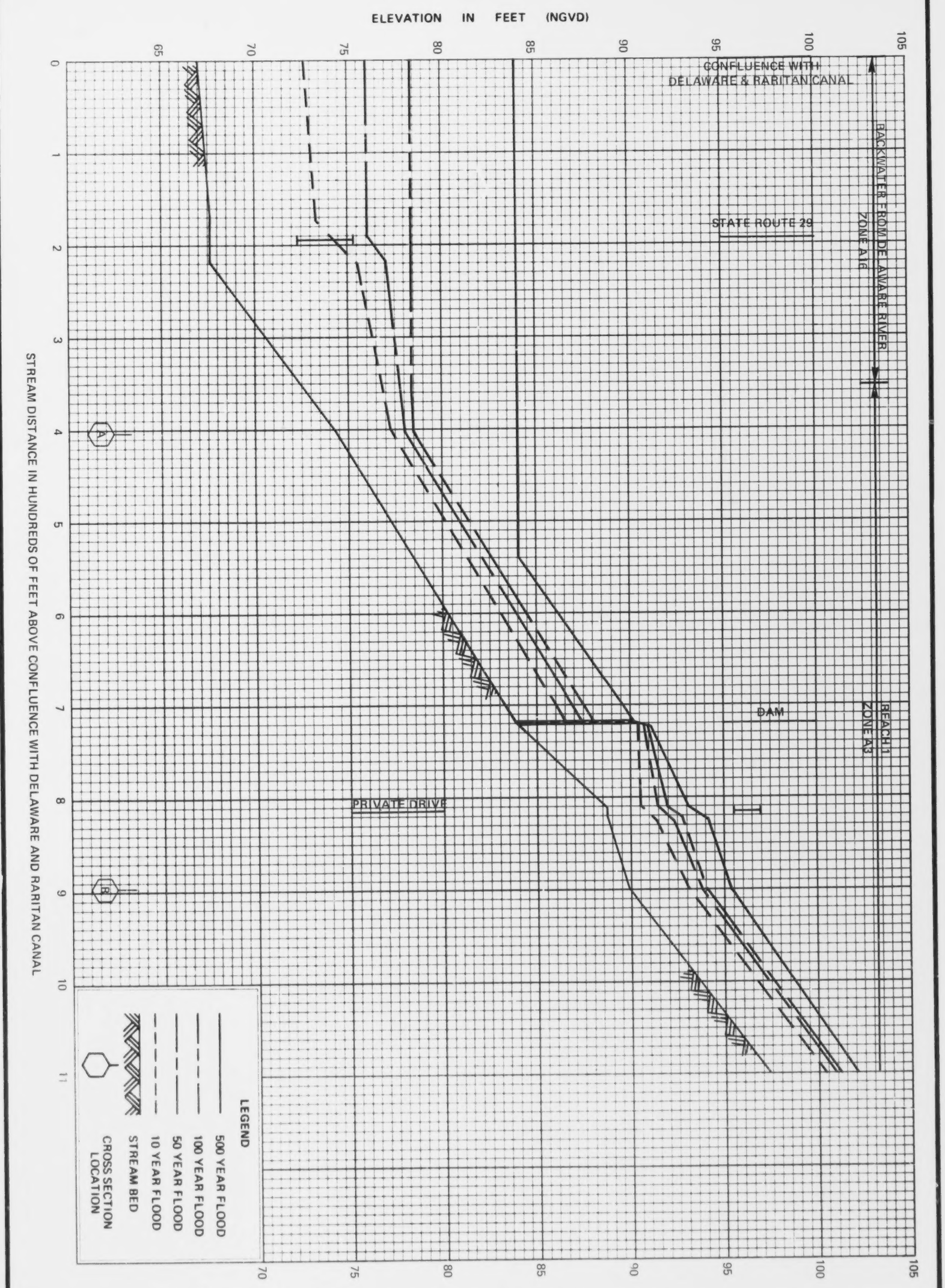

02P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BOROUGH OF STOCKTON, NJ** (HUNTERDON CO.)	**FLOOD PROFILES** **BROOKVILLE CREEK**

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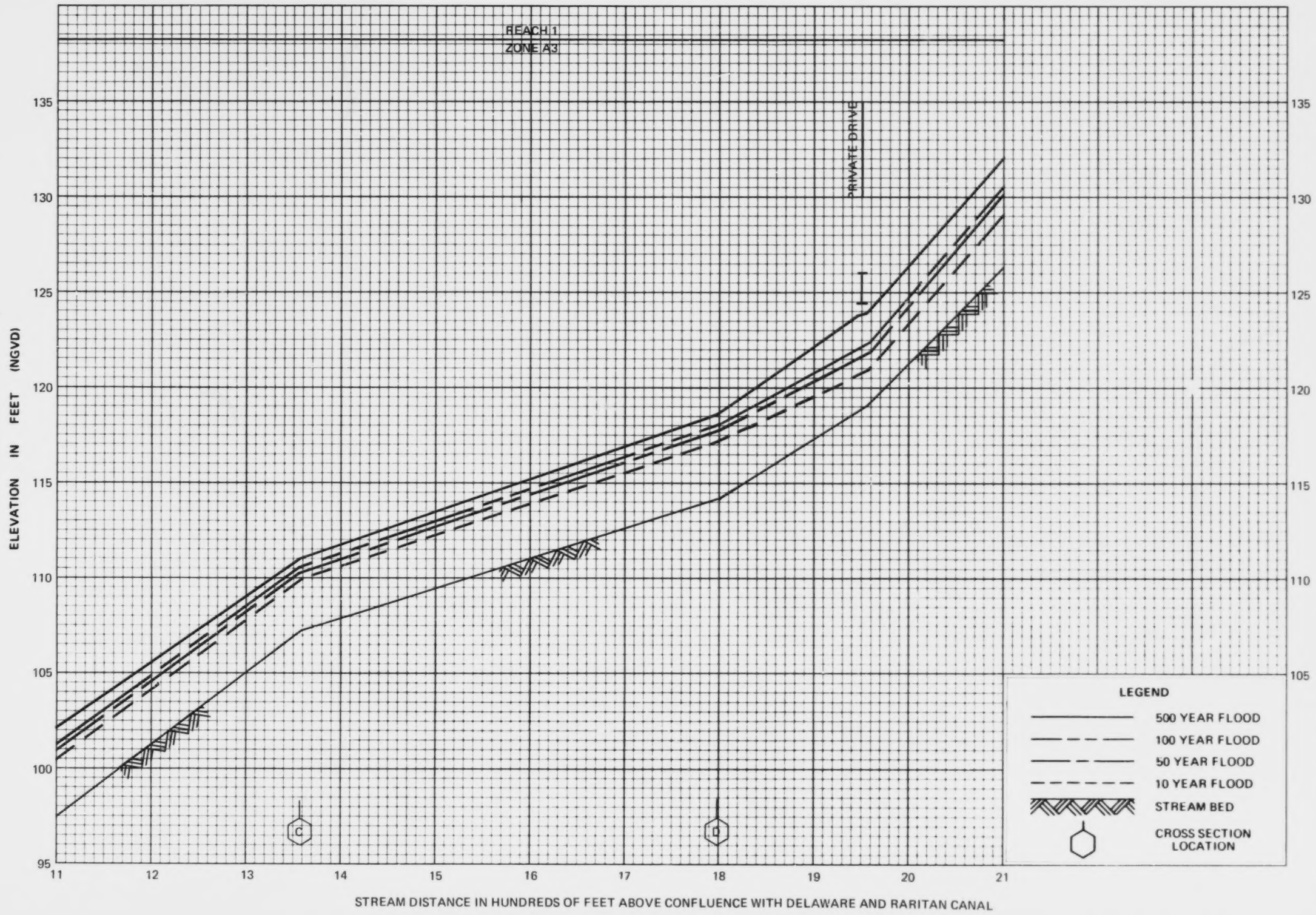


FLOOD PROFILES

BROOKVILLE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

03P

ELEVATION IN FEET (NGVD)

125 130 135 140 145

21 22 23 24 25 26

STREAM DISTANCE IN HUNDREDS OF FEET ABOVE CONFLUENCE WITH DELAWARE AND RARITAN CANAL

DAM

REACH 1
ZONE A3

CORPORATE LIMITS

E

LEGEND

500 YEAR FLOOD

100 YEAR FLOOD

50 YEAR FLOOD

10 YEAR FLOOD

STREAM BED

CROSS SECTION LOCATION

125 130 135 140 145

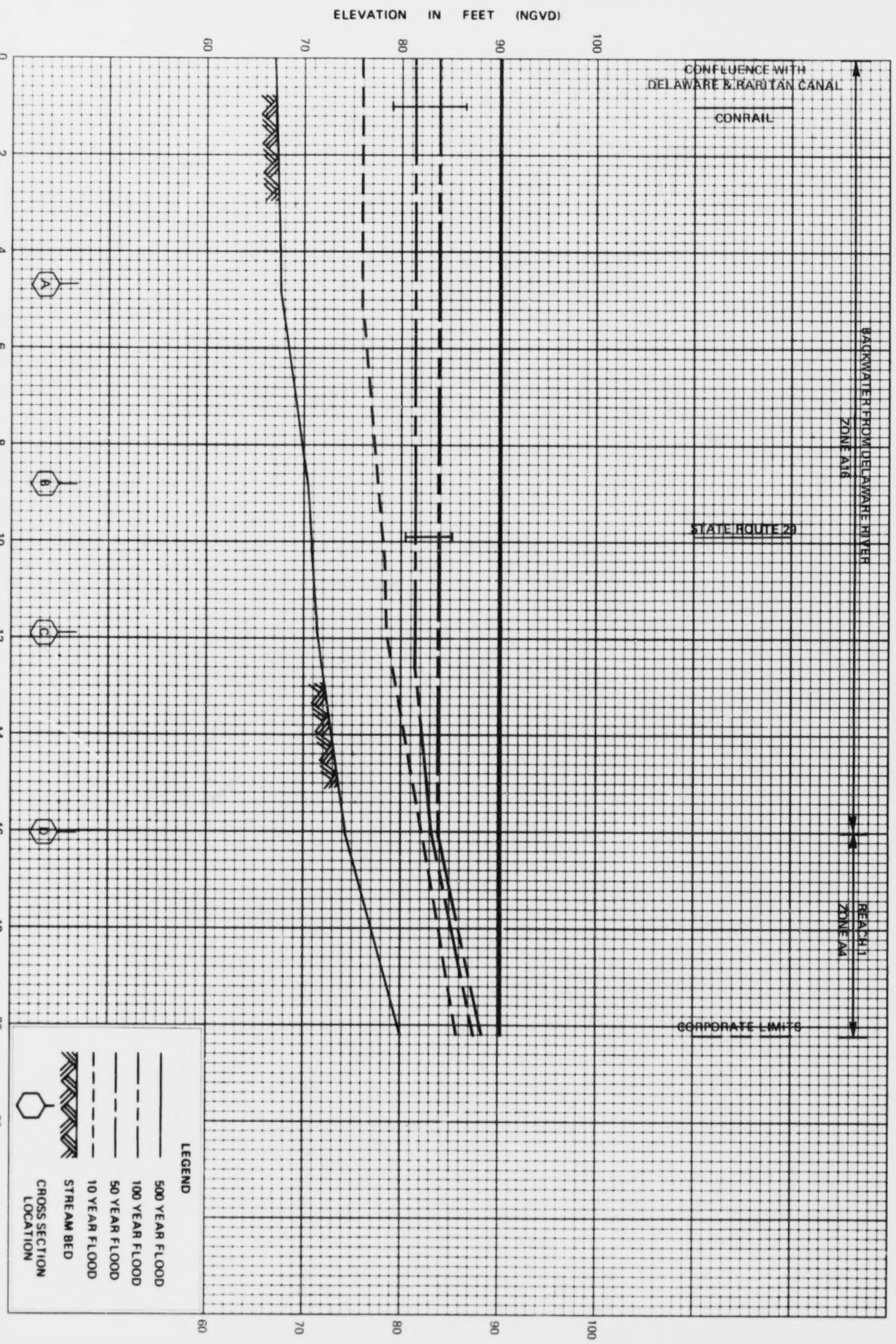
04P

FEDERAL EMERGENCY MANAGEMENT AGENCY

BOROUGH OF STOCKTON, NJ
(HUNTERDON CO.)

FLOOD PROFILES

BROOKVILLE CREEK



05P	FEDERAL EMERGENCY MANAGEMENT AGENCY **BOROUGH OF STOCKTON, NJ** (HUNTERDON CO.)	**FLOOD PROFILES** **WICKECHEOKE CREEK**

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